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Skin problems of the stump in lower limb amputees

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CHAPTER 8

SUMMARY.



Skin problems of the amputation stump in lower limb amputees are relative common in daily clinical practice, possibly impeding prosthetic use. This impediment may have influence on level of activity and level of participation in daily life of a lower limb amputee. However, the knowledge concerning these skin problems was especially based on published expert opinions, without availability of a systematic evaluation of present epidemiological evidence. The aims of this research were: (1) to determine the level of scientific evidence in literature concerning incidence and prevalence of skin problems of the amputation stump in lower limb amputees, (2) to analyse determinants of these skin problems, (3) to determine which proportion of lower limb amputees with a skin problem of the amputation stump are forced to wear the prosthesis less, to analyse the influence of a present skin problem on the amputation stump on level of participation (especially vocation/hobbies), and (4) to determine a point-prevalence of skin problems of the amputation stump in lower limb amputees.

The results of a systematic review of literature concerning incidence and prevalence of skin problems of the amputation stump in lower limb amputees are presented in chapter 2. This literature search was performed in several medical databases (MEDLINE, CINAHL, EMBASE, RECAL) using database specific search strategies. The reference lists of initially identified publications were used as threads for retrieving more publications which were possibly missed in the initial searches. A publication had to be a clinical study or patient surveys (excluding case reports) to be considered eligible for further assessment. Initially 545 publications were identified. After selection, 28 publications were assessed for research methodology. This assessment was performed by using a number of specific selection criteria. Only one publication fulfilled these selection criteria. The prevalence of skin problems of the amputation stump in this publication (concerning a series of 46 lower limb amputees of 65 years and older) was 15%. The conclusion of this study was that knowledge of prevalence and incidence of skin problems of the amputation stump in lower limb amputees is scarce.

When performing the systematic review (chapter 2), several case reports concerning skin problems of the stump in lower limb amputees were identified. An overview of skin problems of the stump in lower limb amputees by means of these case reports is presented in chapter 3a.

A total of 56 reports, comprising 76 cases, were identified in literature. When evaluating the disorders which were described in these case reports, they could be categorized in the following diagnostic categories: acro-angiodermatitis, allergic

contact dermatitis, bullous diseases, epidermal hyperplasia, hyperhidrosis, infections, malignancies, and ulcerations.

Additionally, in chapter 3b a case report concerning a lower limb amputee with a skin problem (follicular keratosis with trichostasis) of her amputation stump not previously reported in literature is presented.

The results of a study with the objective to identify determinants of skin problems of the amputation stump in lower-limb amputees are presented in chapter 4. In a survey, by means of a questionnaire, lower-limb amputees (N=2039) who either obtained their prosthesis through the OIM (a group of orthopedic workshops in the Netherlands) or were member of the (Dutch) National Society of Amputees (LVvG) were invited to participate. In total 872 lower-limb amputees agreed to participate. These participants filled in the questionnaire (which was sent by mail, and could be returned by using a pre-paid envelope) to assess characteristics of the amputation and prosthesis, level of activity, hygiene of amputation stump and prosthesis, and skin problems. The questionnaire was designed for this study by using excerpts from questionnaires which have been previously published in literature, thereby adding questions we thought were relevant for the study. In total, 816 participants returned their questionnaire. Of these questionnaires, 805 were suitable for statistical analysis. This analysis consisted of a stepwise backward logistic regression to analyze determinants of skin problems of the amputation stump, with the presence of skin problems of the amputation stump in the month prior to filling in the questionnaire as main outcome measure. The determinants which decreased the odds on having a skin problem of the amputation stump were (in order of magnitude of association) a higher age, male sex, and a lower limb amputation due to peripheral arterial disease and/or diabetes. The determinants which increased the odds on having a skin problem of the amputation stump were (in order of magnitude of association) use of antibacterial soap, smoking, and washing the amputation stump four times a week or more often. In total, 63% of the participants (95% CI: 60% to 67%) reported one or more skin problems in the month prior to filling in the questionnaire. It was concluded the identified determinants which increased the odds on having a skin problem of the amputation stump in this study have to be studied for their clinical relevance.

As a result of the systematic review presented in chapter 2, a survey by means of a clinical assessment and a questionnaire was performed with the objective to estimate the prevalence of skin problems of the amputation stump clinically, to evaluate the impact of these skin problems, and to evaluate differences between

skin problems observed clinically and skin problems reported by the amputee. The results of this survey are presented in chapter 5. The participants were recruited from a convenience sample of 146 lower limb amputees who visited an orthopaedic workshop in the Netherlands. Eventually, 139 lower limb amputees participated. The skin of the amputation stump of these participants was assessed by a physician. In addition, the participants filled in a questionnaire to assess amputation and prosthesis characteristics, level of activity, hygiene, and present skin problems of the amputation stump. This questionnaire was similar to the one used in the study presented in chapter 4, besides some minor modifications.

After data entry, 124 questionnaires were suitable for statistical analysis, with presence of a skin problem of the amputation stump on participation as main outcome measure.

In the participants in 34% (95% CI 28% to 40%) one or more skin problems of the amputation stump were observed, whereas 36% of the participants (95% CI: 30% to 43%) reported one or more skin problems of the amputation stump. There was a reduction in walking distance without a break due to a skin problem ($p=.012$). An average of .69 (SD=1.0) skin problems were observed, whereas significantly more skin problems were reported (.96, SD=1.7) ($p=.009$). It was concluded that the prevalence of skin problems of the stump in lower limb amputees is 36%. When a skin problem was present, it resulted in a reduction in walking distance. There is a significant, but small, difference between skin problems of the amputation stump observed by the physician and reported by the participants.

The objective of the study presented in chapter 6 was to analyze the influence of skin problems of the amputation stump in lower limb amputees on level of participation. To assess these skin problems and their influence on vocation and/or hobbies, a questionnaire was sent to lower limb amputees. This questionnaire was similar to the questionnaire used in the study presented in chapter 4, whereas the influence of a skin problem of the amputation stump on vocation and/or hobbies was assessed by nine items. These items were adapted from a dermatological questionnaire which assesses influence of a skin problems on quality of life (the DLQI). The nine item scores (scoring range 0-3) were added to calculate the sum score (scoring range 0-27).

A total of 507 participants with one or more skin problems of the amputation stump filled in the questionnaire and responded on the nine items. The data of these questionnaires was suitable for statistical analysis. A negative influence of

a present skin problem of the amputation stump was reported on household, use of prosthesis, social functioning, and performing sports. The statistical analysis resulted in a mean sum score (of the item scores) of 5.5 (SD=4.1). There was a significant correlation between the sum score and the number of complaints reported ($r = .483$, $p = .01$). In a linear regression analysis, with the purpose to analyse which determinants were of influence on the sum score, gender ($\beta = -.15$) and the number of skin complaints ($\beta = .25$) explained 23% of the variance of the analysis. Therefore an influence of a skin problem of the stump in lower limb amputees on vocation and/or hobbies was shown. However, further research is necessary to evaluate the extent of this influence.

In the general discussion (chapter 7), the results from the conducted studies are summarised, and possible implications for clinical practice of these results are mentioned. It is advised to assess determinants in a lower limb amputee with a skin problem of the amputation stump to support proper treatment. Future research should focus on consequences of prosthesis use, consequences of technological changes in prosthetics, to assess the level of influence of a skin problem of the amputation stump on level of participation, and to assess psychological consequences of a skin problem of the amputation stump in lower limb amputees.

In conclusion, on the questions raised before this research, the following answers are given: (1) there is limited evidence concerning incidence and prevalence of skin problems of the stump in lower limb amputees, (2) a series of determinants (smoking, use of antibacterial soap, and washing frequency of the amputation stump) have been identified which have to be studied for clinical relevance, (3) a present skin problem results in a reduction of the time the prosthesis can be worn by the amputee, and there is a reduction in level of participation, and (4) the prevalence of skin problems of the stump in lower limb amputees is between 30 and 40%.

